REMARKS

Claims 1-15, 17, 47-61, 63-79, 81, 82, 100, 102 and 103 have been rejected. No claims have been allowed. Claims 2-6, 48-52 and 66-70 have been cancelled. Claims 1, 7-15, 17, 47, 53-61, 63-65, 71-79, 81-82, 100, 102 and 103 remain pending in the application.

Claim Objections

Claims 2-6, 48-52 and 66-70 were objected to under 37 CFR 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Claims 2-6, 48-52 and 66-70 have been cancelled.

Claim Rejections- 35 U.S.C. §103

Claims 1-15, 17, 47-61, 63-79, 81, 82, 100, 102 and 103 were rejected under 35 U.S.C. §103(a) as being unpatentable over Himmel *et al.* (U.S. Patent No. 6,013,860), in view of Crawford *et al.* (U.S. Patent No. 5,200,338), and in further view of de Boer *et al.* (Gene, 1987, vol. 60, pp. 93-102), and Applicants admissions of the prior art.

Himmel *et al.* discloses engineered plant cells having a DNA for a polysaccharide hydrolyzing enzyme such as a cellulase integrated into the plant cell plastid genome. Himmel *et al.* also teach integrating DNA for the cellulase into the host plant nuclear genome and targeting the expressed enzyme to a cellular organelle such as a plastid. Himmel *et al.* teaches targeting the expressed enzyme to the plastid by means of a plastid transit peptide and the use of marker genes which overcome a natural inhibition by, attenuate or inactivate a selective substance such as antibiotics or herbicides for the selection of desired plant cells. Himmel *et al.* does not show or suggest a transgenic plant having DNA encoding a ligninase.

Enzymatic methods of converting lignocellulose in a plant material to fermentable sugars, GenBank Accession Number X07515 having a plastid signal peptide sequence of the *rbc*S gene as set forth in SEQ ID NO: 2, and the *bar* gene were all known in the art as stated in the Applicant's specification. Additionally, Crawford *et al.* teach a lignin peroxidase enzyme obtained from a bacterial source which is capable of degrading the lignin of lignocellulose. Crawford *et al.* also teach removing lignin from lignocellulose in order to degrade cellulose to allow for the efficient use of cellulosic material. De Boer *et al.* teach lignin peroxidase (LIP) genes *CLG4* (H2, *ckg4*), as set forth in SEQ ID NO: 11, and CLG5 (H10, *ckg5*), as set forth in SEQ ID NO: 13. De Boer *et al.* and Crawford *et al.*, taken alone or in combination, do not show or suggest a transgenic plant having DNA encoding a ligninase, such as *ckg4* or *ckg5*, either with or without DNA encoding a cellulase.

To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify

the reference or to combine reference teachings. According to M.P.E.P. §2143.01 the prior art must suggest the desirability of the claimed invention. "There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper.). The level of skill in the art cannot be relied upon to provide the suggestion to combine references. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999).

The fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish *prima facie* obviousness. Even when the modifications of the prior art necessary to meet the claimed invention would have been well within the ordinary skill of the art at the time the claimed invention was made because the

references relied upon teach that all aspects of the claimed invention were individually known in the art, this is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See also *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000) (Court reversed obviousness rejection involving technologically simple concept because there was no finding as to the principle or specific understanding within the knowledge of a skilled artisan that would have motivated the skilled artisan to make the claimed invention); *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999) (The level of skill in the art cannot be relied upon to provide the suggestion to combine references.). That one can reconstruct and/or explain the theoretical mechanism of an invention by means of logic and sound scientific reasoning does not afford the basis for an obviousness conclusion unless that logic and reasoning also supplies sufficient impetus to have led one of ordinary skill in the art to combine the teachings of the references to

make the claimed invention. *Ex parte Levengood*, 28 USPQ2d at 1302.

In the present rejection, it is stated that one of skill in the art would have been motivated by the knowledge common in the art that ligninase gene products are valuable materials for breaking down lignocellulose into fermentables, such as taught by Crawford *et al.* at column 1, lines 38-54. Even when a person of ordinary skill in the art is aware that ligninase gene products are valuable materials for breaking down lignocellulose into fermentables and it is within the capabilities of one of ordinary skill in the art to make the invention from the known individual elements of the invention, there still is not sufficient *impetus* to lead one of ordinary skill in the art to provide a transgenic plant having a DNA encoding a ligninase comprising a lignin peroxidase gene such that lignocellulose is degraded when the transgenic plant is ground.

The teaching or suggestion which motivates the person of skill in the art to make the claimed combination must be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20

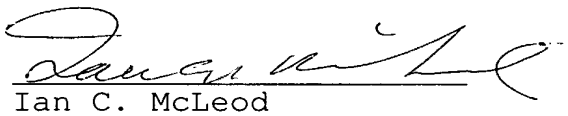
USPQ2d 1438 (Fed. Cir. 1991). Himmel *et al.* does not teach or suggest degrading lignin, and even if Crawford *et al.* motivated a person of skill in the art to degrade lignin to allow for the efficient use of cellulosic material, Crawford *et al.* would suggest to the person of skill in the art to utilize a simple and effective enzyme preparation or lysate derived from a microbial source (col. 6, lines 44-48) or other prokaryotic hosts by DNA technology (col. 7, lines 49 through col. 8, line 55) as the best alternative to fungal lignin degradation.

Crawford *et al.* suggests that recombinant bacterial strains are preferred because of the ease of modification of the bacterial genomes (col. 8, lines 38-41). A person of ordinary skill in the art would not be motivated by the teaching of Crawford *et al.* to attempt insertion of the ligninase gene directly into herbaceous plants, since it is known in the art that plants are much more difficult to genetically modify by recombinant techniques. The references would not provide sufficient impetus to incorporate the ligninase genes into herbaceous plants when Crawford *et al.* teaches the advantages of recombinant bacterial strains and enzyme

preparations. There is no suggestion of any advantage to attempt such an approach when enzymes and bacterial strains can be so easily manipulated as fully described in Crawford *et al.* (col. 7, line 15 through col. 8, line 55). Therefore, Crawford *et al.* teaches away from incorporating the ligninase genes into herbaceous plants, and teach simple and effective solutions to the problem of degrading lignin. Nothing in Crawford *et al.* gives a person of skill in the art impetus to even try the claimed invention taken alone or in combination with the other references. Himmel *et al.*, Crawford et al., and de Boer *et al.*, either taken alone or in combination, do not show or suggest the limitations of the claimed invention. In light of the these arguments Claims 1, 7-15, 17, 47, 53-61, 63-65, 71-79, 81-82, 100, 102 and 103 are patentable over Himmel *et al.*, Crawford et al., and de Boer *et al.*, either taken alone or in combination. Reconsideration of the rejection is requested.

The cited references in combination do not teach all of the elements of the present invention. Therefore, in light of the above, it is now believed that Claims 1, 7-15, 17, 47, 53-61, 63-65, 71-79, 81-82, 100, 102 and 103 are patentable and in condition suitable for allowance. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,



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